

Bellwork 3/1/13

1) One factor of $f(x) = 3x^3 + 8x^2 - 57x + 18$ is $(x-3)$. What are the other two factors?

$$\begin{array}{r|rrrr} 3 & 3 & 8 & -57 & 18 \\ & \downarrow & 9 & 51 & -18 \\ \hline & 3 & 17 & -6 & 0 \end{array}$$

$3x^2 + 17x - 6$
 $(3x^2 + 18x)(-1x - 6)$
 $3x(x+6) - 1(x+6)$

Factors: $(x-3)(3x-1)(x+6)$

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$$2x^4 - 11x^3 - 6x^2 + 64x + 32$$

$$\begin{array}{r|rrrrr} -2 & 2 & -11 & -6 & 44 & 32 \\ & \downarrow & -4 & 30 & -48 & -32 \\ \hline 4 & 2 & -15 & 24 & 16 & 0 \\ & \downarrow & 8 & -28 & -16 \\ \hline & 2 & -7 & -4 & 0 \end{array}$$

$$\begin{array}{l} 2x^2 - 7x - 4 \\ (2x^2 - 8x)(x - 4) \\ 2x(x-4) + 1(x-4) \end{array}$$

Factors:
 $(x+2)(x-4)$
 $(2x+1)(x-4)$

Roots: $-2, 4$
 $-\frac{1}{2}, 4$

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$$x^3 - 5x^2 + 2x + 8$$

$$\begin{array}{r|rrrr} 2 & 1 & -5 & 2 & 8 \\ & & 2 & -6 & -8 \\ \hline & 1 & -3 & -4 & 0 \end{array}$$

$$x^2 - 3x - 4$$

$$(x-4)(x+1)$$

$$\text{Factors: } \frac{(x-2)(x-4)}{(x+1)}$$

$$\text{Roots: } 2, 4, -$$

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Algebra 2
5.5 - Graphing Polynomials WKST 1

Name: _____
Date: _____ Pd: _____

Graph the function on the graph on the right

$$1) \quad f(x) = 2x^3 + 3x^2 - 8x + 3$$

$$2(0)^3 + 3(0)^2 - 8(0) + 3$$

$$\text{Maximum \# of roots: } 3$$

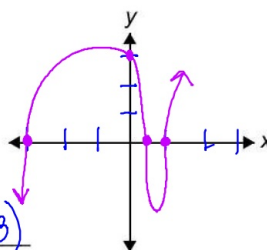
$$\frac{1, 3}{1, 2} \quad \text{Possible rational roots: } \pm 1 \pm \frac{1}{2} \pm 3 \pm \frac{3}{2}$$

$$\text{Factored form: } (x-1)(2x-1)(x+3)$$

$$\text{Actual roots: } 1, \frac{1}{2}, -3$$

$$x=0 \quad y\text{-intercept} = (0, 3) \quad \text{end behavior: } \downarrow \text{ left, } \uparrow \text{ right.}$$

$$\begin{array}{r|rrrr} 1 & 2 & 3 & -8 & 3 \\ & & 2 & 5 & -3 \\ \hline & 2 & 5 & -3 & 0 \end{array} \quad \begin{array}{l} 2x^2 + 5x - 3 \\ (2x^2 + 6x - 1x - 3) \\ (2x-1)(x+3) \end{array}$$



$$2) \quad f(x) = -x^3 + 2x^2 + 13x + 10$$

$$-1(x^3 - 2x^2 - 13x - 10)$$

$$\text{Maximum \# of roots: } 3$$

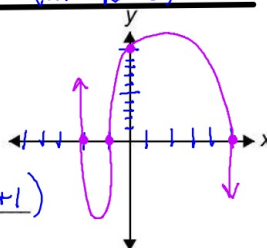
$$\frac{1, 2, 5, 10}{1} \quad \text{Possible rational roots: } \pm 1, \pm 2, \pm 5, \pm 10$$

$$\text{Factored form: } -1(x+2)(x-5)(x+1)$$

$$\text{Actual roots: } -2, 5, -1$$

$$x=0 \quad y\text{-intercept} = (0, 10) \quad \text{end behavior: } \uparrow \text{ left, } \downarrow \text{ right.}$$

$$\begin{array}{r|rrrr} -2 & 1 & -2 & -13 & -10 \\ & & -2 & 8 & 10 \\ \hline & 1 & -4 & -5 & 0 \end{array} \quad \begin{array}{l} x^2 - 4x - 5 \\ (x-5)(x+1) \end{array}$$



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3) $f(x) = x^4 + x^3 - 13x^2 - 25x - 12$

Maximum # of roots: 4

Possible rational roots: $\pm 1, \pm 2, \pm 3, \pm 4, \pm 6, \pm 12$

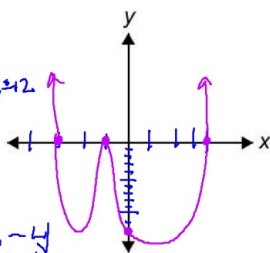
Factored form: $(x+3)(x+1)(x+1)(x-4)$

Actual roots: -3, -1, -1, 4

y-intercept = $(0, -12)$
end behavior: up left, up right.

$$\begin{array}{r} -3 \overline{) 1 \quad -13 \quad -25 \quad -12} \\ \underline{-3 \quad 9 \quad 12} \\ 0 \quad 0 \quad 0 \end{array}$$

$$\begin{array}{r} x^2 - 3x - 4 \\ (x-4)(x+1) \end{array}$$



4) $f(x) = -6x^4 + 11x^3 + 51x^2 - 99x + 27$

Maximum # of roots: 4

Possible rational roots: $\pm 1, \pm 3, \pm 9, \pm 27, \pm \frac{1}{2}, \pm \frac{3}{2}, \pm \frac{9}{2}, \pm \frac{27}{2}$

Factored form: $-1(x-3)(x+3)(3x-1)(2x-3)$

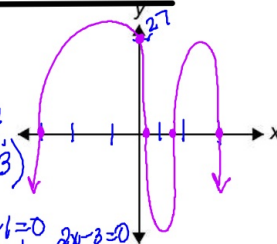
Actual roots: 3, -3, 1/3, 3/2

y-intercept = $(0, 27)$
end behavior: down left, down right.

$$\begin{array}{r} +3 \overline{) -6 \quad 11 \quad 51 \quad -99 \quad 27} \\ \underline{-6 \quad 18 \quad 81 \quad -99} \\ 0 \quad 0 \quad 0 \end{array}$$

$$\begin{array}{l} 3x-1=0 \quad 2x-3=0 \\ 3x=1 \quad 2x=3 \\ x=1/3 \quad x=3/2 \end{array}$$

$$\begin{array}{r} -6x^2 + 11x - 3 \\ -(6x^2 - 11x + 3) \\ (6x^2 - 9x) - (2x - 3) \\ 3x(2x - 3) - 1(2x - 3) \end{array}$$



Homework: Graphing Polynomials Wkst 2

